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EXAMINER	
SPIEGLER, ALEXANDER H	

ART UNIT	PAPER NUMBER
1637	//

DATE MAILED: 10/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/826,522	DEPHILLIPO ET AL.	
	Examiner	Art Unit	
	Alexander H. Spiegler	1637	

-- The MAILING DATE of this communication appears on the c ver sheet with the c rrespondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 May 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,39,40,60-85 and 87-97* is/are pending in the application.

4a) Of the above claim(s) *1 and 40* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *39, 60-85 and 87-97* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Status of the Application

1. This action is in response to Paper No. 10, filed on May 27, 2003. Currently, claims 1, 39, 40, 60-85 and 87-97 are pending, Claims 58, 59 and 86 have been canceled, Claims 1 and 40 have been withdrawn from consideration, and Claims 39, 60-85 and 87-97 are rejection herein. All arguments have been fully considered and thoroughly reviewed, but are deemed not persuasive for the reasons that follow. This action is made FINAL. Any objections and rejections not reiterated below are hereby withdrawn. Specifically, the 112, second paragraph rejections have been withdrawn in view of Applicant's amendments and arguments.

1st Paragraph (Written Description)

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 39, 60-85 and 87-97 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. This is a written description rejection.

35 U.S.C.§ 112, requires, *inter alia*, that a patent specification contain a written description of the invention and the manner and process of making and using it "...in such full clear and concise terms as to enable one skilled in the art... to make and use" the invention.

While it is well settled that a patent application need not teach each possible embodiment of the claimed invention, it is manifestly true that written description cannot be settled by reliance on that which has not been achieved in the art, or that which is not disclosed in the specification. That is, a specification is not considered to satisfy the requirement for an adequate written description if it fails to disclose the specific starting materials or conditions for making the invention. (*Genentech, Inc. v. Novo Nordisk*, 108 F3d. 1361, 42 USPQ2d 100. Fed. Cir. 1997), or evidence that the applicants at the time the application was filed, has possession of the claimed invention.

Additionally, *Vas-Cath Inc. v. Mahurkar*, 19 USPQ2d 1111, makes clear that "applicant must convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in *possession* of the invention. The invention is, for purposes of the written description inquiry, *whatever is now claimed* (See page 1117)." The specification does not "clearly allow persons of ordinary skill in the art to recognize that [he or she] invented what is claimed (See Vas-Cath at page 1116)."

The claims are broadly drawn to methods of selecting a dose of an anti-oxidant composition for administration to a human, comprising assessing occurrence in the human's genome of disorder-associated polymorphisms in at least two genes selected from the group consisting of,

a) genes which encode an enzyme that catalyzes conversion of a toxic oxygen species to a less toxic oxygen species;

b) genes which encode a protein that provides protection against oxidative stress; and

c) genes which encode a protein that induces production of a toxic oxygen species,

whereby the occurrence of any of the polymorphisms is an indication that a greater dose of the composition should be administered to the human; and selecting a dose of the composition based on occurrence of the polymorphisms.

The specification teaches several isolated polymorphisms in specific genes, which can be informative for susceptibility to oxidative stress (pg. 12-13). Specifically, the specification teaches two polymorphisms in MnSOD, two polymorphisms in CZSOD, and one polymorphism in each of thirteen distinct, unrelated genes. Therefore, the specification teaches only two polymorphisms in two distinct genes, and one polymorphism in thirteen unrelated genes.

The claims lack written description for reasons:

1) Genes a) through c) are each drawn to a specific genus of genes, the specification only teaches species of each these genes, which are not a representative number of species for support of the claimed genus. For example, c) is drawn to "genes which encode a protein that induces production of a toxic oxygen species" would encompass an extremely large number of possible genes that could be encompassed by this genus. The specification does not provide any guidance or description as to what genes are encompassed by this genus, let alone, any evidence that Applicants were in possession of any of these genes. In other words, Applicants have not adequately described genes that are encompassed in a) to c).

2) The claims are drawn to assessing occurrence in any disorder-associated polymorphisms, but the specification has only taught isolated polymorphisms in distinct genes. The specification teaches: a "disorder-associated polymorphism is an alternative form of a portion of a gene, wherein occurrence of the alternative form in the genome of a human has been correlated with exhibition by the human of a disease or a pathological state" (pg. 7, ln. 15-17).

Therefore, a "disorder-associated" encompasses a large number of possible polymorphisms. The claims are drawn to occurrence of any polymorphism that "is an alternative form of a portion of a gene, wherein occurrence of the alternative form in the genome of a human has been correlated with exhibition by the human of a disease or a pathological state", however, the claims only teach one or two polymorphisms in each gene. These one or two polymorphisms are not representative of the unlimited number of polymorphisms in genes a) to c) that is claimed. Furthermore, Applicants were only in possession of the polymorphisms on page 12 of the specification, and were not in possession of the plurality of possible polymorphisms that are encompassed by the claims.

Therefore, Applicants have not provided sufficient evidence that they were in possession, at the time of filing, of the invention as it is broadly claimed and thus, the written description requirement has not been satisfied for the claims as they are broadly written. Applicants attention is drawn to the Guidelines for the Examination of Patent Applications under 35 U.S.C. 112, ¶ 1 "Written Description" Requirement, Federal Register, Vol. 66, No. 4, pages 1099-1111, Friday January 5, 2001.

Response to Applicants Arguments

The claims are broadly drawn to detecting an occurrence of any disorder associated polymorphism (DAP) in a plurality of possible genes encompassed in a) – c) of the claimed invention. For example, c) is drawn to "genes which encode a protein that induces production of a toxic oxygen species". That is, *any* gene which encodes *any* protein that induces the production of a toxic oxygen species.

First, the specification does not characterize what is encompassed by a "toxic oxygen species", and furthermore, encompasses *any* protein that directly or indirectly produces this "toxic oxygen species". Again, proteins that could be encompassed by this genus are not characterized by the specification (e.g., by structure). Thus, the possibility of what is encompassed by a "toxic oxygen species" or a protein that produces this species is very broad, especially in light of Applicants lack of description regarding the characteristics of these groups. The same analysis holds for a) and b).

Also, it is also noted that the claims are drawn to groups of genes that are based solely on function (e.g., genes which encode a protein *that induces production of a toxic oxygen species*). However, the specification is silent to any structure for genes that are encompassed by the claimed invention (i.e., the specification does not teach provide a description of any sufficient, relevant, identifying characteristics for the members of the genus). Thus, these genes can only be identified by their broad functional activity, yet have no structural characteristics in which a person skilled in the art would recognize that the inventor had possession of the claimed invention. Because of the lack of description of the structure of the genes encompassed by a) – c), the specification does not reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention

Even assuming that the skilled artisan was able to find the genes encompassed by the genus of a) – c), the artisan would still need to find polymorphisms that are disorder-associated polymorphisms. As stated above, and reiterated by Applicants (see Applicants response on page 19), the polymorphisms encompassed by the claim language include polymorphisms that are associated with ANY disease or pathological state. Thus, the skilled artisan would have to

experiment to find polymorphisms that could be considered DAPs, since it is clear that not all of the polymorphisms in the genes would necessarily be DAPs.

Furthermore, once the DAP is found (or if it is previously known), the DAP may block or knock out the function of the gene which might cause the "production of a toxic oxygen species", for example. A DAP can either affect the protein function of the gene, or alternatively, the DAP might be linked to a pathological state based solely on screening assay of particular populations. Thus, it is not clear as to what the correlation between the occurrences of *any* DAP and the indication that a greater dose of an anti-oxidant composition is needed. In other words, there is no linkage between any arbitrary DAP and an indication that an anti-oxidant dosage should be greater. Accordingly, even assuming a skilled artisan was in possession of a DAP in a gene encompassed in a) – c), the skilled artisan would not be in possession of the claimed invention, absent the description in the specification regarding characteristics shared by those DAPs that indicate that a greater dose of an anti-oxidant should be administered.

Applicants argue that the teaching of the class of genes represented in Claim 62 is representative of the genus claimed. However, as discussed above, the specification does not provide any structural descriptions, e.g., any sufficient, relevant, identifying characteristics for the members of the genus, and therefore, one skilled in the art would not recognize that the inventor had possession of the claimed invention.

Applicants further argue "a polymorphism in any of those relevant genes that is sufficiently detrimental to be manifested (even in only some humans) as a disorder is sufficient to increase the susceptibility of a human to OS" (page 17 of Applicants response). However, as discussed above, the specification does not teach the characteristics of these DAPs to arrive at

the conclusion that any DAPs is sufficient to increase the susceptibility. For example, the specification does not teach any sufficient, relevant, identifying characteristics for DAPs that necessarily links the DAPs to an indication that a greater does of an anti-oxidant should be administered to a subject.

Accordingly, for these reasons and those of record, the written description rejection is maintained.

1st Paragraph (Enablement)

4. Claims 39, 60-85 and 87-97 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Case law has established that "(t)o be enabling, the specification of a patent must teach those skilled in the art how to make and use the full scope of the claimed invention without 'undue experimentation.'" *In re Wright* 990 F.2d 1557, 1561. In *In re Fisher*, 427 F.2d 833, 839, 166 USPQ 18, 24 (CCPA 1970) it was determined that "(t)he scope of the claims must bear a reasonable correlation to the scope of enablement provided by the specification to persons of ordinary skill in the art". The amount of guidance needed to enable the invention is related to the amount of knowledge in the art as well as the predictability in the art. Furthermore, the court in *Genetech Inc. v Novo Nordisk* 42 USPQ2d 1001 held that "(I)t is the specification, not the knowledge of one skilled in the art that must supply the novel aspects of the invention in order to constitute adequate enablement".

In Ex parte Forman, 230 USPQ 546 (Bd. App. 1986), the Board considered the issue of enablement in molecular biology. In considering these factors:

1) In order to practice the invention, the practitioner must find the possible genes that satisfy the requirements of the genes set out in claim 39, and furthermore, a practitioner must find polymorphisms in these genes that affect oxidative stress. The specification does not list or suggest what genes would fall into each category of genes listed in a) through c), and it could conceivably encompass hundreds, if not, thousands of genes, especially in light of claim language such as, "genes which encode a protein that induces production of a toxic oxygen species". Claims 62 and 87 list a number of genes, however, the specification does not teach under what categories these genes fall under, and only teach one or two polymorphisms in each gene that may be associated with oxidative stress.

2) The specification provides guidance on several isolated polymorphisms in specific genes, which can be informative for susceptibility to oxidative stress (pg. 12-13). Specifically, the specification teaches two polymorphisms in MnSOD, two polymorphisms in CZSOD, and one polymorphism in each of thirteen distinct, unrelated genes. Therefore, the specification teaches only two polymorphisms in two distinct genes, and one polymorphism in thirteen unrelated genes. The specification also provides guidance for general methods of detecting polymorphisms (pg. 17-18). HOWEVER, the specification does not provide guidance as to how to determine disorder-associated polymorphisms of the genes listed in a) through c) (of claim 39), *wherein the occurrence of said polymorphisms is an indication that a greater dose of an anti-oxidant composition should be administered to a human.* That is, the specification does not

teach how one skilled in the art can correlation any possible DAP and administering a greater dose of an anti-oxidant.

3) No working examples are presented.

4) The invention is directed to methods of selecting a dose of an anti-oxidant composition for administration to a human, comprising assessing occurrence in the human's genome of disorder-associated polymorphisms in at least two genes selected from the group consisting of

a) genes which encode an enzyme that catalyzes conversion of a toxic oxygen species to a less toxic oxygen species;

b) genes which encode a protein that provides protection against oxidative stress; and

c) genes which encode a protein that induces production of a toxic oxygen species, whereby the occurrence of any of the polymorphisms is an indication that a greater dose of the composition should be administered to the human; and selecting a dose of the composition based on occurrence of the polymorphisms.

5) The prior art of Forsberg et al. (Arch. Biochem Biophys (2001) May 1: 389(1): 84-93) teaches a detailed review of polymorphisms and oxidative stress. Specifically, Forsberg teaches polymorphisms in several genes related to oxidative stress and their effects (Table I and pgs. 85-89). Forsberg also teaches that while actually finding polymorphisms is not unduly burdensome (pg. 84, 2nd column), determining the actual phenotypic effect (i.e. correlating the polymorphism to a condition), requires extensive studies (pg. 85, 1st column).

Forsberg states,

"*These are the early days for using a genetic epidemiological approach to the study of oxidative stress-related disease.* As has been the case for other association studies, *it is expected*

that positive studies will be contrasted by negative results. Therefore, *large-scale genotyping methods and carefully selected populations will be required to generate reliable data...to determine the impact of oxidative stress...* Human genome and comprehensive polymorphisms data will become available shortly, determination of phenotypes will proceed more slowly, but eventually a global approach where many carefully characterized genetic variants will be queried in disease association studies is an achievable goal" (pg. 90, 2nd column to pg. 91, 1st column).

In summary, Forsberg underscores the difficulty and unpredictability in the art, of correlating polymorphisms and oxidative stress.

6) The level of skill in molecular biology is high.

7) The results of experiments involving correlating polymorphisms and oxidative stress are not predictable, as taught above by Forsberg.

8) The claims are broadly drawn, reciting any possible polymorphism in any number of genes.

Based on the above analysis, one of ordinary skill in the art would be subject to undue experimentation in carrying out the method as claimed. Accordingly, the specification has not adequately taught of one ordinary skill in the art how to practice the claimed invention.

Response to Applicants Arguments

The claims are broadly drawn to detecting an occurrence of any disorder associated polymorphism (DAP) in a plurality of possible genes encompassed in a) – c) of the claimed invention. For example, c) is drawn to "genes which encode a protein that induces production of a toxic oxygen species". That is, *any* gene which encodes *any* protein that induces the production of a toxic oxygen species. With respect to a), any gene which could even indirectly encode an enzyme that catalyzes conversion of a toxic oxygen species to a less toxic oxygen species would be encompassed by the claim language. Thus, class of possible genes encompassed by the genus of a) – c) is very large.

Applicant argues the disclosure of a small population of genes encompassed by the claims enables the skilled artisan to determine DAPS in any gene encompassed by the claim language. However, the specification is silent to any structure or common features of the genes, other than the function that are encompassed by the claimed invention. Thus, the skilled artisan would necessarily have to perform an experiment, relying entirely on trial and error, with no guidance as to how to find genes that might be encompassed by the broad claim language. This trial and error process would necessarily cause undue experimentation.

Even assuming that the skilled artisan was able to find the genes encompassed by the genus of a) – c), the artisan would still need to find polymorphisms that are disorder-associated polymorphisms. As stated above, and reiterated by Applicants (see Applicants response on page 19), the polymorphisms encompassed by the claim language include polymorphisms that are associated with ANY disease or pathological state. Thus, the skilled artisan would have to experiment to find polymorphisms that could be considered DAPs, since it is clear that not all of the polymorphisms in the genes would necessarily be DAPs. Again, this would necessarily require an unpredictable trial and error process.

Furthermore, once the DAP is found (or if it is previously known), the DAP may block or knock out the function of the gene which might cause the "production of a toxic oxygen species", for example. A DAP can either affect the protein function of the gene, or alternatively, the DAP might be linked to a pathological state based solely on screening assay of particular populations. Thus, it is not clear as to what the correlation between the occurrences of *any* DAP and the indication that a greater dose of an anti-oxidant composition is needed. In other words, there is no linkage between any arbitrary DAP and an indication that an anti-oxidant dosage

should be greater. Applicants have not provided any guidance or evidence to substantiate or support the claim that any arbitrary DAP in any of the possible genes encompassed in a) – c), will lead to the administration of a greater dose of an anti-oxidant.

Applicants allege and argue the specification enables a skilled artisan to identify a gene falling within the genus of a) – c), and then identify the occurrence of any polymorphisms that has been correlated with a disease or pathological state, wherein the occurrence of any DAP is an indication that a greater dose of an anti-oxidant compositions should be administered to the human. Applicants argue the specification teaches the genes in Claim 62 and DAPs associated with those genes (see pages 20-21 of Applicants response). Applicants also argue that more DAPs can obtainable from the SNP consortium and NCBI (see page 21 of Applicants response). Essentially, Applicants allege that genes and DAPs encompassed by the present invention are either known or readily available, and the present invention is an "elegantly simple" method, which only requires selecting any gene in the genus of a) – c) and the identification of any polymorphism of that gene associated with any pathological state (see pages 20 and 24 of Applicants response). Following this identification, Applicants state, "by analyzing occurrence in a human's genome of these detrimental polymorphisms, one can estimate the susceptibility of that human to oxidative damage and select an appropriate dose of an anti-oxidant composition to administer to the human." (see page 17 of Applicants response)

Applicants arguments have been considered, but are not persuasive for the reasons above and the following reasons. First, even assuming a skilled artisan can identify a DAP in one the possible genes encompassed by a) – c), the specification provides no guidance or evidence to support that this DAP leads to the selection of an appropriate dose of an antioxidant composition.

The specification teaches that "weighing factors" can be "assigned" to polymorphisms depending on their roles in oxidative stress (pg. 15, 1-5, for example). Also, the specification teaches that another factor which can influence the significance that is assigned to the DAP is "the degree to which the polymorphism is correlated with the corresponding disorder", wherein some disorders are highly correlated with the occurrence of a polymorphism and some are not (pg. 15, lines, 8-12). However, the specification does not teach any specific parameters or criteria in assessing the above factors. The specification is also silent with respect to any formulas or specific guidance for determining whether the occurrence of a DAP in a gene is correlated for the administration of a greater does of an anti-oxidant. That is, given the teachings of the specification, a skilled artisan would not know how to determine whether the DAP identified necessarily correlated with the administration of a greater does of an anti-oxidant composition. Furthermore, the specification is silent as to where the starting point is for the initial dose of an anti-oxidant. That is, at what point does the occurrence of a DAP correlate with the need for an *increased* dose of an anti-oxidant.

The enablement inquiry is this case centers upon the unpredictability in arriving at the results of the claimed assay. First, as discussed above, the identification of the DAPs in genes encompassed by a) – c) requires undue experimentation, as the specification does not provide adequate guidance regarding the identification of genes or DAPs in said genes. Even assuming the skilled artisan can find a DAP of any of the genes in a) – c), the specification does not supply the novel aspects or guidance of how to one can correlate any arbitrary DAP and the indication of administering a greater dose of an ant-oxidant composition.

In essence, the experimentation that one skilled in the art would be required to perform is in fact the proposed novelty of the invention. "(I)t is the specification, not the knowledge of one skilled in the art that must supply the novel aspects of the invention in order to constitute adequate enablement". (*Genetech Inc. v Novo Nordisk* 42 USPQ2d 1001).

Accordingly, for these reasons, and those of record, the enablement rejection is maintained.

Conclusion

5. No claims area allowable.

Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexander H. Spiegler whose telephone number is (703) 305-0806. The examiner can normally be reached on Monday through Friday, 7:00 AM to 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Benzion can be reached on (703) 308-1119. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-4242 and (703) 305-3014. Applicant is also invited to contact the TC 1600 Customer Service Hotline at (703) 308-0198.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0196.

Alexander H. Spiegler
October 2, 2003

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